

10a

111

Extract from Dr. Bush
Lectures 1792

Notes on the lectures of Dr. Benjamin Rush.

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Vol 1

Professor Rush
L. Notes on Rush vol-1 fol. 126-7
proofs of the circulation of the blood

1 From the structure of the valves of the heart, they are calculated to let the blood pass from the auricles into the ventricles, & from the ventricles into the pulmonary artery & aorta, but prevent the blood from returning

2^{dly} From the valves in the veins allowing only of the blood passing from the extremities towards the heart. —

3 Ligatures applied on a vein, cause it to swell between the ligature & extremity.
When applied on an artery, it swells between the ligature & the heart

4th From injections passing from the arteries into the veins & mes

5th From microscopical observations, the blood may be seen circulating thro' the gills & fins of fish; & thro' feet of certain water fowl

6th By the transfusion of the blood of from the arteries of one animal, into the veins of another (previously exhausted of blood)

7th From the phenomena of hemorrhage

The causes which produce the motion of the blood in the arteries are, ¹ the action of the heart. 2^d The stimulus of the blood on the excitability of the heart & arteries.

3^d The stimulus of pure air in the blood.

Haller denies the arteries excitability but from his own words, indirectly proves their excitability. Dr Rush cites the fact that if the leg be crossed, the popliteal artery will act with a force sufficient to move the foot, which cannot depend on the action of the heart. After death in some diseases, the arteries are found empty.

4th The quantity of blood has an influence on the circulation being about 25th according to Vanhsore. Harvey was so sensible of the excitability of the arteries, that he called them, the "primum vivens" & "ultimum moriens" of the living animal body.

The causes of the bloods circulation in the
veins, are, 1st The pressure of contiguous muscles.

2nd The pressure of the diaphragm, abdominal
viscera &c made indirectly by the abdominal
muscles. - also the Contiguity of arteries may
quicken the motion of the blood in the veins.

3rd Respiration. 4 A peculiar excitability in
the veins, proven to exist, by Drs Haller &
Warshone.

5 The mixture of lymph & chyle with the
blood, which renders it less viscid

The Uses of the Circulation of the Blood

1.st To excite the action of the brain which ceases as soon as the circulation is stopped.

2.^d To distribute the heat generated in the lung, to every part of the body. —

3 To diffuse moisture to every part of the body.

4 To afford fluid for all the secretions.

5 To afford nourishment to the body, & prevent its decay.

6 To impart tone, sensibility, & irritability to the system. —

7 To supply the brain with blood for the purpose of secreting the nervous fluid. —

In the nervous system Dr Rush includes
the mind, brain, nerves, muscles & tendons.

Some have asserted that the nerves of volun-
tary motion arise from the Cerebrum, & those
of involuntary motion from the cerebellum -
but Dr R treats this notion as an idle
fancy. —

Dr Rush infers that the brain is the
seat of the mind, from the following facts.
viz. ^{1st} That the nerves to supply 4 of the senses
arise within one inch from their destination.
2^{dly} The great quantity of blood sent to the brain,
Haller says $\frac{1}{5}$ of the whole blood. Monro says
 $\frac{1}{10}$ part of the whole; the arteries of the
~~head~~ ^{plexain} are flexible, & their coats thinner than
any others of the body.

3 I infer it from

4 The brain appears to be glandular, secreting a fluid thinner than the brain. —

5 The veins of the brain are destitute of valves till they make their exit from the skull

6 There are no lymphatics in the brain. —

7 Man has more brain than any other animal. Each man a larger brain in proportion to his strength of intellect.

Professor Blumenback procured 10 skulls of different nations. They all differed in size & figure. The nations ~~were~~ were Turks, Tartars, Calmuck, Nations of Moors, several North-American Indians, & some from the Carribee Islands. Dr. Mouru weighed the brain of a man

& an ox; the mans brain weighed 6 times
the heaviest - while his body weighed but one
6 part as much as the ox. —

Dr. Monro supposes the ganglions of the nerves
are a kind of little brains where a fresh supply
of nervous juice is generated, as they are mostly
seated on the nerves that go to the vital
organs. —

The nerves originate in every part of the body
& terminate in the brain or vice versa. More
of them are distributed to the skin & muscles,
than to the viscera & bones; for the uses of
sensation & motion. Dr. Monro calls the nervous
fluid Ether. Dr. Sp. calls it Electroid fluid which
answers to the galvanic influence, & differs in
the following particulars from the electric fluid.
Lay bare the Sciatic nerve of a frog, coat it

with tin foil, touch one end of the nerve with a piece of zinc, & the other with silver, which excite convulsions in the frog even 100 times after the animals death; the heart may be excited in the same manner. —

1st It exist in an accumulated state in the nerves at the same time that a conductor is applied to them, Electricity would fly off.

2^d It differs from Electricity in the nature of its conductors, Charcoal which is a nonconductor of electricity, ~~but~~ conducts the electroid fluid powerfully; the same is the case with several fluids.

3^d The Electric fluid stimulates plants, to ~~growth~~ growth, The Electroid does not

4. The Electroid fluid resists putrefaction while Electricity disposes to it. —

5 If an Electric spark be applied to the tongue, it will excite pain, ~~without~~ any taste, but the Electroid gives a saltish taste to the tongue as may be felt by placing a piece of zinc over & silver under the tongue & bringing the edges together, when the 2 metals come in contact a saline taste is evident on the tongue

5 Electricity smells like phosphorus, the Electroid fluid has no smell. —

The shock from the Torpedo Electric Eel, ~~and~~ Gymnotus Electricus, is different Dr Fowler says from the Electric spark, he says that the electroid fluid is increased ⁱⁿ inflamed ⁱⁿ parts

2^d Elasticity is increased by the tension of bodies, but muscles are not tense. —

3^d The muscles possess a power much greater in the living animal, than when taken out of the dead body. — This force or living muscular strength is excited by the will, & is sufficient to cause a flea to raise a weight 80 times heavier than itself. A horse will raise a weight greatly above his own, & yet his muscles would break with a much less force out of the body. This is of extensive application ⁱⁿ patholog; as I shall observe when treating of convulsions.

of Sensation. — They are simple, where a mere knowledge that an impression has been made remains. They are reflex when they convey to the mind a knowledge, or idea of the nature or quality of the impression; as agreeable, delightful, or pleasurable; which result from beauty, a fine prospect, or from gratifying the senses, passions, ^{with wine opium &c} &c. And on the other hand Disagreeable, unpleasant or painful. In the first the sight from viewing disgusting objects; low spirits from nervous affections — Surgical operations, burns, incisions & other injuries. &c. Does sensation always result from impression? I answer no — The operation of a Diuretic is attended with no sensation & some cathartics produce but little sensation. Sensation does not always lead to the part impressed, as a stone in the bladder produces a sick Stomach

In like manner the sight of colors never gives us a hint that they depend on the refraction of the rays of light. nor does a sharp sound, to use Hallers words, inform us that it is produced by 5000 vibrations of the air in a second of time.

It is the will of the creator that impressions on the nerves, of a like kind, shall ~~excite~~ excite Ideas in the minds of all persons, & at all times in the same person, when in the same degree. —

The Laws of Sensation are

- 1st All sensations are proportionate to the force of the impression, & excitability of the part. —
- 2^d The force being given the sensation is proportionate to the duration of the impression
- 3rd Only one sensation can exist at the same time, if I pluck a hair out of a persons head, & give him a blow on the part, the pain of plucking the hair will be lost in this last greater impression.

If you give a dog a dose of Nuxvomica, & then whip him, the emetic will not operate

Tho' a number of ^{different} musical instruments may emit ^{widely} different sounds - yet their union gives us the sensation of harmony. —

If a boy paint his top of different colors & whip it - the colors are so confounded as to give us the Idea only ^{of} one color. —

If blue & yellow be presented to the eye at once & in the same place ~~gives~~ the sensation of green will be excited, for this purpose they must be synchronous - Take notice of these facts, they are of extensive application in Therapeutics. —

The quick succession of Ideas, & conceptions in reading, has made some emphatically call it a ^{the} C sense. I think with Dr Whitt, that it is a succession of sensations, & not several at one time.

4 Another law of sensation, is that it continues a considerable time after the impression which excited it is removed. Thus after an amputation the patient feels a sense of itching, or pain in the same foot hours, weeks & even months afterwards.

5 Some impressions are so forcible as to destroy the faculty of sensation. When the system ceases to be acted on by any inferior stimulus, as is the case after receiving the miasmata that produces the yellow fever, & plague &c. -

also in Surgical operations patients complain much at first; but much less toward the last.

Sensibility resides in the nerves, irritability in the muscular fibre. These seem to be very different in degree, or in different parts of the body. The heart possesses much ~~an~~ irritability, but very little sensibility. It is believed the lungs possess much sensibility at birth & lose it with adult age.

Of Sensibility

1st All impressions convey a stronger sensation at their first application, & the longer a stimulus is applied the weaker is its action. Thus if we continue in an unpleasantly warm temperature, the inconvenience of the heat soon subsides. This will not hold in all cases; a drop of water continued from a moderate height on a man's head will become exquisitely painful; this was used by the inquisition as a punishment. —

2^d Impressions require to be ~~repe~~ increased after habit has rendered them inactive - 62° of Fahrenheit is comfortable to young people, but old people require 70° or 75° to feel comfortable

3^d Stimuli that is unpleasant at first, by repetition becomes pleasant. Tobacco & ~~addent~~ ^{alcy} Spirits are both disagreeable at first but ^{by} habit become agreeable; Shakespeare understood this law of sensation well

4th Certain impression loose by repetition - Thus antimony, Jalap, opium, & other medicines require to be used in larger doses by those who have been accustomed to them. This explains how the natives of the West Indies become insensible to that most powerful stimulus, the miasmata which produces the yellow fever.

5th Sensations arising from comparison become more acute by repetition

6. ^{ly.} Two sensation which arise from impressions made at the same time, and afterward connected in our minds. This I explain from association of Ideas. Association of Ideas is 1.st Natural, & 2. Artificial. for an example of the artificial if we hear the first line of a poem which we have read it recalls to our recollection the subsequent parts of it.

Irritability

The influence of habits on actions depending on this is also very great.

1. Motions by repetition become habitual, thus when we go to bed, we by habit take the pot & make water whether there is need or not. This we call association of motion.

2.^d The muscles by repetition become associated, a child in attempting to throw itself on its mothers breast, will move in every wrong direction, till it hits on the right one, which by repetition it will retain.

3^d Repetition of muscular action is followed by
by an increase power in the muscles to per-
form the action. This is evident in dancing
Tumblers & PT

4th Certain actions become involuntary by repetition, as
winking &c. —

5 Muscular strength increases with the gradual
increase of action; thus a man who lifts a calf
every day in the year will lift a cow at the
end of the year

6 By repetition the act of respiration may be
more & more dispensed with, as in divers who by
practice have acquired the power of holding their
breath several minutes.

17th There is a repetition of motion in some cases without
the stimulus of impression to produce it, but merely
that of custom; as in the case of making water before
going to bed.

8 Repetition of certain motion together is followed by the inability to perform them separately - as in walking we move both hands, in attempting to extend one finger, all are extended &c.

9 Repetition.

10th Repetition fixes the period for the return of certain motions; thus we wake generally at the same hour every morning; hence perhaps the periodical return of many diseases, as the paroxysms of intermittents &c.

Thus then have I mentioned the effects of habit on motion, sensation, & thought, or on animals while alive. I proceed next to take notice of that power by which impression on one part, produces motion in another remote from it. This power is called sympathy, & is divided into active & passive

The former is increased in the same ratio, that the latter is diminished. Some have attempted to explain Sympathy on nervous influences. But Dr Whytt disproves the agency of the nerves and brain in sympathy; for no nervous communication exists between the stomach & skin. The breasts & uterus; the bladder, & the stomach; the stomach, & the soles of the feet. — The same hold with Tetanus depending on wounds in the feet. —

Further, the teeth are affected by sympathy with ^{the} ear, from the noise of a file on iron, or scratching of glass. & The glands penis itch from the irritation of a stone in the bladder; I have seen the glands in so irritable a state, that on being rubbed mortification of the gland took place —

3 Rising in the throat in Hysteria. Itching in noses of children from worms. The only explanation that can be given, is a continuation

of the same membranes over the Lungs, the Lungs, Stomach & intestines, urethra, nares & every other cavity. —

4th Dr. Wm Hunter in his account of the diseases of Jamaica; mention his patients in dysenteric feeling, when they swallowed any thing, as if it were passing thro' them, which induced a motion & discharge of slimy mucus. This sensation is very like what is called dysentery. It is to be referred to a sympathy or consent between the cardia, & anus. —

5th Does not the sympathy between the rectum & uterus, go to prove that sympathy is carried on without the intervention of brain? ^{they} The relaxation of the skin in yellow fever, after blistering, is explicable, without sympathy, from the emptiness of the vessels of the part. —

An vision. After describing the
organ of vision; Dr B. give his Idea's
of Light, which he thinks the finest
of matter, in the form of a fluid, always
existing in every part of the solar system,
and only requires the presence of the sun
to put ^{it} in motion, it not being an
emanation from that planet. Sir
Isaac Newton divided light into primitive
Rays viz. Red, orange, yellow, green, blue,
Indigo & violet - By reversing the initial
letters of these colors the word Vib or yor is
the result, which will help the memory.

color is a mere quality of matter, depend
ing on its power of reflecting the rays of
light. The Idea of Whiteness is excited in the
mind, when all the rays are reflected, & black
ness when all are absorbed, or none reflected. —

When all the rays pass thro' it, the substance is said to be transparent; Opaque when it reflects the rays. Red. is the most & violet the least, refrangible rays. All the varieties of color in nature are modifications of these 7 primitive Rays.

The angle of incidence, in the rays of light, is always equal to the angle of reflection. Light suffers different degrees of refraction in proportion to the density of the medium through which it passes.

Thus in passing thro' air into water, it is refracted to the perpendicular; & in passing from water thro' air vice versa, or from the perpendicular direction. Rays of light are brought to a focus in passing thro' a convex transparent body & diverge in passing thro' a concave one hence the use of the Chrystalline Lens of the eye. —

Vision

All the rays of light reflected from the object at which we look ~~on pass~~ through the cornea, & aqueous humour & suffer some refraction, which brings the rays nearer their axis of the eye; only such as strike the eye at an angle greater than 40° . In passing through the crystalline lens they are refracted so as to form a focus on the retina, which is most likely promoted by their passage thro' the vitreous humour.

The pigmentum nigrum spread on the ciliary processes appears to stop part of the rays when the light is too intense.

The Retina, & not the Choroides, is the seat of vision, this differs from the retina being alike in all animals, while the Choroides is ~~very~~ different.

The retina is also very nervous & vascular while the choroidea is not. —

When the cornea & globe of the eye is too flat it is called ~~hyper~~hyperopia, when too convex, myopia

in the ^{last} ~~first~~ the rays are converged so as to form a focus before they reach the retina; in the ~~last~~ ^{first} the focus falls behind the retina;

indistinct vision is the consequence in both cases — the ^{last} ~~former~~ is relieved by double concave

glasses, or viewing objects at a distance — The ^{first} ~~latter~~

by a convex glass, or viewing objects nearer — The proper distance for reading, when vision is perfect is about one foot from the eye.

In viewing distant objects, the pupil contracts more than near ones. The pupil contracts by the stimulus of light & dilates ~~with~~ in the dark. —

Dr. Mounroe relates 2 cases of Mydriasis
pneumonia in which the pupil contracted ^{ing} ~~by~~
the ~~by~~ ^{dark} ~~light~~ & dilated in the light
I have never heard of any other such cases.

The sudden transition from strong light
to darkness, or from darkness to a glare of
light are both prejudicial to vision;
hence the tender care of the Creator in
ushering in the day, & night gradually.

The color of the iris varies, in different
nations, & different climates; in the tropics it
is black, which suffocates the glare of light,
while in northern climates it is gray, blue &c.
Our Indians may form an exception, as
their eyes are black; but I think they
are not aborigines of the northern parts
of America —

We are told by Philosophers every thing
is painted on the retina in an inverted
position, how then do we see them in
their proper position? we are answered
by the force of habit. But when person
born with Cataract have that obstructi-
on removed, they see every thing in the
natural position, which sets aside
the above explanation. The only ex-
planation which I can give of it is that
the mind follows the rays of light as they
proceed from the object. Thus the mind
will follow the ray that comes from
the top of the object, tho' it is painted on
the inferior part of the retina - and
vice versa. To prove that objects are inverted
on the retina, remove the posterior coat of the
eye with the retina, & apply piece of paper
in lieu of the retina, where the inverted object
may be seen on the paper. (J. Dorey, M.D.)

We have 2 eyes & 2 retinas, why do we not see all objects double? This question has been answered like the last, viz. by the influence of habit. — But I suppose it depends ^{on} a law of the system, viz. that ~~the~~ two impressions of equal force, cannot be felt at the same time, or that the impression on the 2 retinas produce but one sensation in the mind; 2 impressions, on 2 parts, of equal sensibility, are synchronous, & produce but one Idea.

By attending to what has been said on Light, Colors & Vision; the following facts are explicable, viz. Some animals see best in the dark, from a large pupil, light gives them pain. Pain from light, after darkness, depends on the increased sensibility of the retina. The eye becomes languid by looking at a black object, which absorbs all the rays of light as a piece of black cloth. The Creator has spread a mantle of green over the face of the earth

because it is the color exactly midway
between the extremes of the most refrangible
and least refrangible rays of light. Y for green stands
in the middle of the word *vib gyok*. Red is too
strong, Violet too weak stimulus for the eye.
Reading on the back, or looking at a book
directly downward are both very hurtful; in the
first, the eye is supported by the muscles, in the
last, it hangs by them. Reading & writing on
a sloping desk is the best. When it is practice
able let the light come obliquely over your
shoulder in reading, so that it will fall on the
book before it strikes the eye. Avoid flattening
the eye by pressure when you wash ~~the~~
your face. Combing down of black hair over the eyes
or large black eyebrows help to suffocate the rays
of light. The early use of spectacles are beneficial

Hearing 1st I must make a few observations on sound, which is emitted from the percussion or collision of solid elastic bodies; and propagated by tremors or corresponding vibration in the air.

There noise & sound; Noise consists of a coarse harsh sound in which the tremors are not numerous, as in the explosion of gun powder &c. Sound is conducted by air, water & earth.

A Soldier at last town 7 miles above this city, knew when mud fort, 8 miles below the city, surrendered to the British; by sticking the blade of his knife into the ground & applying his ear to the handle; he could hear the firing of the cannon, & knew when they ceased; his prediction proved correct. By striking 2 sonorous bodies together under water the sound may be heard. —

When a bell is struck by a hammer, its form is changed from a circular to an elliptical & vice versa, very frequently; which proves that sound depends on the tremulations of the body. —

Elasticity favors sound, Brass & Silver, are more sonorous than Gold, or Lead. Tension is essential. — The string of a violin will not sound unless it be tense. — Collision of elastic bodies produce ~~some~~ compound sound, non elastic simple sounds.

Sounds are either acute or grave, & between these there appears to be no limits. — The only difference in the number of vibrations, the graver the sound the fewer the vibrations in a second of time.

Some have calculated the grave sounds to consist of from 30 vibrations & less in second — And all above that number to be acute sound. At Euler supposes the most acute sounds to consist of 520 vibrations in a second of time.

Length, hardness, softness, tension, in
chorded instruments, influence sound, as
Elasticity, figure thickness, or thinness of
matter ^{in solid bodies} does. Gallileus placed a tumbler of
water on a table, & by means of
playing on a violin near it, caused the
tumbler to move so as to agitate the
water, which trembled perceptibly quicker
with every increased octave - which proves
that acute sounds have more vibrations
than grave ones. If 2 chords in every re-
spect similar, except one being half as long
as the other, be struck with equal force, the
short one will emit a sound exactly twice as acute
as the long one. Air is necessary to the emission of sound
a bell rung in vacuo produces no sound, a pistol
can hardly be heard when fired at the top
of the peak of Teneriff.

Sound travels at the rate of 1142 feet in a second of time. Certain substances prevent the emission of sound; snow on the ground prevents the noise of carriages; Tallow on the strings of a violin prevents them from emitting sound. certain furniture in a room prevents the sound of the voice or instruments to a certain degree. The famous blind philosopher Brilloy, could tell, by hearing his foot ^{steps, &c. &c.} whether there was furniture in the room or not. — Sound, like light, is capable of reflexion; the angle of reflexion, & incidence are also equal; as is known by blowing into a conch shell; Echo is sound reflected. Echo is more perfectly in imitation of the original sound, if reflected from a large hard body, as a large Rock &c. At 63 feet one syllable is reflected by Echo. At 127 feet 2 syllables, At 190 feet 3 syllables. At a greater distance words of almost any number of syllables will be echoed.

I proceed next to the history of
the human mind, denominated by phyloso-
phers, the internal senses. —

In treating of the mind, I shall ^{1st} consider
the faculties. 2^d The operations. This will
be useful in our pathology, & Practice of
Physic & without it, it will be impossible to
understand the diseases of the mind. —

The 1st question that occurs, is, what is
the mind, & of what is it composed? Three
opinions have prevailed on this subject.
viz. 1st That it is immaterial. 2^d That it is
composed of an exquisitely subtilized matter,
connected with the body by juxtaposition,
but capable of existing without or separate
from the body. This is the opinion of the Last

Mr Locke appears to think, that the
Great first cause of all things, is only is
immaterial. —

3^d That the mind is neither material nor
immaterial, but produced by impressions on
the brain; and that these impressions as certain
= by produce thought & the other operations
of the mind, as impressions on the retina,
produce vision, or sapid bodies taste. —

Some have thought this opinion repugnant
to Christianity, but this I deny. They say the
soul or mind must be spiritual & endure
forever, that matter is destructible &c
But altho matter may be altered variously,
Chemistry teaches it is as indestructible as
Spirit. What I shall teach you on the
mind, its diseases, & remedies, does not interfere
with either of these three opinions, or the
validity of the Christian religion

For a correct detail on this subject, I
refer you to the controversy of Descartes,
and Locke, on the mind. — The mate-
riality & immortality of the soul are by no
means incompatible. —

I shall by way of preliminary, just
observe, that 1.st The body & mind mutually
act & react on each other, as much as
any one piece of matter acts on another.

The senses are the avenues thro' which
impressions are made on the brain,
the faculties of the mind are excited by
the impression, & the result is the ope-
rations of the mind. —

What are the faculties of the
mind? I answer, Memory, Understanding,

Imagination, Will, Passions, Moral faculty, including sense of beauty, conscience, & moral faculty properly so called. —

What are the operations of the mind?

Answer Perception, association, Judgment, & Reason. —

2^d Each faculty of the mind occupies a particular spot, or part of the brain. The brain being the seat of these faculties as the heart is of the passions. —

3. All the operations are the effect of impressions, which excite motion in that particular spot of the brain, where these operations are ~~acted~~ performed. By motion I do not mean the oscillation of some philosophers, but carry my ideas of motion further than has before been done, with microscopes of sufficient power. I think we should be able to see, ~~the~~ on opening the cranium, every thought & idea to be

attend with motion, whether of the Electric fluid, or as Hartley supposes, of the matter of the brain vibrating, is immaterial

This is no stretch of the imagination, when we reflect that the membrana tympani, which is 10,000 times less than the brain, is capable of 20,000 distinct vibrations ~~in an~~ each of which is capable of producing a distinct idea in the mind. Impressions on the brain are made by 2 classes of stimuli external & internal - the former affect the mind thro' the external senses. Among the latter may be reckoned some of the actions of the mind which reflected, act as stimuli. But they are of trifling consequence when compared with the impressions thro' the medium of the senses; for without the senses there would be no mind

4.th The perfect use of the mind depends ~~off~~ on a certain medium of motion, resulting from a particular consistence of the matter of the brain; thus in infants it appears not to have acquired a sufficiently firm consistence; in middle life it is of the proper consistence; in maniacs & very old people it is too hard.

As before observed the Faculties of the mind are - Memory, Imagination, Understanding, Will ^{of passion} ~~and~~ Moral Faculties. The last is subdivided into. Sense of Deity, Conscience, and moral Faculty strictly so called.

Memory is of 2 kinds, active, & retentive; the latter characterizes the mere scholar; the man of genius possesses both. Reminiscence differs from both, in this, that the presence of the object that excited the original Idea is required. Shakespeare the Philosopher of nature in his Tempest makes ~~himself~~ Prospero ask his daughter, who was cast

on the enchanted Island, at 3 years of age whether she had any recollection of her native country - Hence he placed the origin of memory about the 3 years. -

Infants learn much in their first years, not only a language composed of an immense number of words, but the ideas which those words represent, & things of which they are the names. Hence the propriety of Dr Gregories assertion that a child learns more the first 3 years of its life than any 30 years afterwards.

Savage nations possess memory in a very limited degree - our Indians at a Treaty arrange themselves in such a manner as to retain each a small part of the speech, & when the first thinks his mind saturated, he hunches his next neighbour who does the same soon in succession,

They then meet & each their parts remem-
bered by each, & send back their answer. —

The memory of some savages is so bad that
they can only count more than their fingers
& toes. Helvetious even tells us of some incapable
of counting more than ~~three~~.

Memory is of 4 distinct kinds viz. —

Memory of words, of numbers, of names & of Ideas,
each of which probably has different seats in
the brain. Children & lay ers possess the
first to a great degree; Dr _____ informs us

that he knew a young corsican who repeated
a discourse of 36,000 words which he only once heard
read. Cyrus could call his army consisting of 100,000
men, by their individual names. Gedediah

Buxton who after hearing a long sermon
could tell the number of words contained in
it. Thos Fuller could multiply numbers in his mind

without the help of figures, to a great ex-
tent. In all these extraordinary ^{cases of} memory,
there appears to be a deficiency of judg-
ment. Memory for Ideas appears to be by far
the most useful of the 4 species, it is
this species of memory that distinguishes the
philosopher from the scholar, or learned
man. Few people possess to considerable de-
gree the 4 kind of memory. Dr Lardner
whose memory for Ideas was very great,
forgot his own name. The celebrated
Linnaeus, after recovering from a fit of apoplexy
forgot his wife's maiden name. A gentleman
of my acquaintance has a great memory
for Ideas, but none for words. But more on
this subject when we come to treat of the
diseases of the memory

Imagination is a peculiar Faculty differing from memory. 1.st Because memory because memory only has relation to the past, while Imagination is unlimited as to time, past, present & to come are open to it. 2.^{dly} Imagination has for its objects, real, as well as, imaginary circumstances. 3.^{dly} Memory is a Magazine or warehouse of the mind, & may be compared to history; Imagination to painting, or a camera obscura. Or Memory may be compared to a ship moved entirely by oars; Imagination to a vessel moved by sails & oars. Imagination is the Pioneer to all useful discoveries in the arts & sciences, except such as are discovered by accident. It is Christopher Columbus for Discoveries. It travels all countries, near, & remote; all ages past, present & future; traverses the surface of the globe, & sho'out the universe, & all this in the twinkling of an eye! The possession of this Faculty approaches on one of the attributes of Deity Omnipresence

It differs with respect to its objects. In Sir Isaac
Newton its object was the material world, laws
of matter, & Works of Nature. In Mr. Locke its
object was the Faculties & operations of the human
mind. In Shakespeare, men & manners,
Passions, principles, of man & the nature of his
heart &c. It is an indispensable ingredient in
genius, & improves the arts & sciences greatly. -

What is the difference between Fancy &
Imagination? Dr. Stewart says the difference
is great; he says Fancy enables a poet to
render his Images rich & luxuriant; Imagi-
nation with Images sublime & beautiful.

They differ in their objects, those of fancy are
fantasms, witches, ghosts, hobgoblins &c. the like;
those of Imagination tho' equally false, not
so improbable or unnatural

Understanding, according to Locke the other

faculties are subservient to this, hence Lockes book has been called an essay on the human understanding. The Imagination furnishes us with Ideas, the understanding connects them.

The understanding is the seat of reason & Judgment; It is the touch-stone of truth, & error. To carry on our comparison of the ship; Memory may be compared to the cargo, Imagination is the Rudder, & understanding the skilfull Pilot, who conducts them into port.

Will. By this faculty we are enabled to choose that which is good, & refuse that which is evil. The will is the seat of power, & the Basis of human hapiness. This determines whether an action be right or wrong. The casuists say, if a man put out his neighbours eye by accident he commits no crime - but if in a fit of anger, or wantonly, he commits that act, he is Criminal.

Hence the Schoolmen say "Voluntas facit peccatum" The Doctrine of free agency does not affect this point. Memory may be compared to a house; Imagination to the magnificent furniture of it confusedly thrown into a yard; the Will, to the skillful artist who arranges the furniture in such a manner as to combine elegance with convenience. As to continue our comparison of the ship, which is now arrived in port, the will is the boat which the cargo to shore.

Passions are divided into passions properly so called, & emotions. The seat of these is the heart. They are to the mind what the senses are to the body. The passions are again divided into passions & propensities. Passions differ from emotions in being accompanied with desire or aversion, which the latter are not. Thus love is accompanied with desire; fear is not. C

Some of the emotions as anger appears to be accompanied with a desire of revenge, but this is unconnected with the Emotion of anger. The Passions are Joy, Grief, Avarice, Love, Hatred and the like. Emotions are more sudden, as Anger Fear &c. Affections of the mind are sympathy Friendship &c —

Moral Faculties. These are 3 to wit.

Moral Faculty properly so called, sense of Deity, & Conscience. They exist at birth, and are unfolded as they receive impressions; thence the disputes about the absurdities of innate Ideas. 1st Moral Faculty may be aptly compared to a legislator — Conscience to a judge; the first condemns the actions of others, the latter our own. 2nd We have proof of the existence of the moral faculty independent of conscience. 3rd Moral Faculty may be compared to the understanding, Conscience to the Will — 3rd There is sometimes a Conscience, with the absence of the moral faculty. Conscience is seated in the

Understanding; Moral Faculty in the Will;
Conscience is the light which St. John says lighteth
every man that ^{cometh} into the world. —

Sense of Deity exists in every mind. Savages
possess it, which is a certain evidence of ^a first great
cause, & distinguishes man from all other animals,
who possess the other faculties of the mind. Some
animals appear to possess a degree of moral faculty;
witness the Shame & penitent looks of a dog after
committing a fault. But sense of Deity exclusive-
ly belongs to man. Hence the only rational
definition which has ever been given of man,
is, that he is an animal capable of religion.

It renders man a sociable animal. He would
be unhappy without a sense of Deity with-
out society. I have said no man ever ex-
isted without a sense of Deity. Capt Cook
objects by saying that he has seen savages

who did not possess a sense of Deity, but it is a fact that obtains so generally, that I am disposed to think Capt Cook was deceived.

Whether it be manifested by worshipping an Image, the sun, moon, or stars - A cat, a Dog, a bull, a Crocodile, or even an Onion; Still I repeat it again every man possesses a sense of Deity, tho' obscured by superstition & ignorance.

You might as well object to the universality of the sense of vision, because a nation of Africans have theirs perverted; as doubt the universality of a sense of Deity, because it is perverted by one savage nation. There are seven classes of worship paid to the Deity 1st The worship of winds, & clouds. 2^d Thunder, lightning. Rivers &c. 3^d Bad spirits. 4th A compound of good & bad spirits, 5th A number of good & bad spirits. 6th One good & one evil spirit. 7th The true God. Man rises at length to the worship of the proper Deity, who has condescended to reveal, to man the true object of worship, & from this all the forms of worship

now corrupted, have originated. As well could
I conceive of hearing without sound, as a sense
of Deity from any other source. —

Conscience is our Regula regulata non regu-
=lans. The moral faculty is the regula regu-
=lans non regulata. Conscience is the sole Judge
of the propriety & impropriety of our own
actions; No human Creature ever wanted it
but such as St Paul says have seared
it with a red hot Iron. It is the high Court
of Errors & appeals of the mind, by which the
other faculties are regulated. It is one of the
greatest blessings the supreme being could have
bestowed on human nature. His care of us is evin-
=ced 1.st In the great number of moral faculties,
which is a security of our moral happiness.
2.^{ly} In bestowing mental happiness independantly

of the other mental faculties, so that the wisest men are not the happiest, as would be the case, if mental happiness depended on the perfection of the other faculties. also the certain & sudden action of conscience. The rational faculties are given us for this world, the moral faculties appear destined for the world to come.

Our Ideas of right & wrong are derived from the moral faculty. Conscience acts instantaneously, and its first decisions are best. In the rational faculties second thoughts are always best. Conscience, like the mentor in Telemachus, is our guard against every danger ^{to which we} we are exposed. Life has been compared to a voyage; moral faculty is the compass, Conscience keeps the reckoning, & sense of Deity is the pilot who guides us to the desired port. As well might we say that the passions of the sexes for each other was formed at puberty as to suppose to the sense of Deity is not coexistent with every man, & put into action at a more advanced period of life. Conscience is Gods witness with man

"He will not leave man without a witness
on earth." It is "the light which enlighteneth
every man that cometh into the world."

This doctrine however unfashionable, is true;
for God has made no part of his works in
vain or for naught.

Before dismissing this subject, I will make
the following queries. Are there any other
faculties than those we are acquainted with,
which remain in a quiescent state? Is Intuition
of this kind? Do not the alterations which these
undergo, afford an argument in favor of this
opinion? may not our knowledge in a future
state be acquired by means of new faculties &
senses, & may not these last be the means by
which we are to acquire new sources of pleasure
& happiness in a future state? I answer, I
believe in the affirmative.

All the Faculties of the mind thus connect-
ed, may be compared to a well regulated
government, in which memory may be supposed
the house of representatives, where evidence or facts
are collected; The Understanding is the Senate
with the power of passing laws. The moral fac-
-culty may be compared to a Court of Justice
where those laws are enforced. Will is the Supreme
Executive whose deputies are the Passions. The
sense of Duty may be considered the Court of
Errors & appeals or as they are properly called
in New England Courts of Conscience. & conscience
is the Judge who condemns or acquits. —

We now pass to consider the Operations of these
Faculties. They are Perception, Association
Judgment & Reason. Volition is also an opera-
tion of the mind, but occurs promiscuously
after any of the other operations. By keeping
the word pair in the mind you will
remember their ^{Initials} ~~names~~ & arrangement of
the operations

1. ^H Perception is the most simple act
of the mind, it results from impress-
ions on the brain through the senses;
e.g. If I place my hand by accident on
a heated stove; perception pain ~~is~~ from
the heat, is the simplest & first act of
my mind. And yet in this simple operation
of the mind, 2 faculties are concerned viz.
memory & Understanding. Locke calls the
result of this operation an Idea. Descartes
supposed ^{Ideas, ~~if~~ only,} images of objects, as an house, an
horse. &c. Bishop Berkeley supposed the Idea
to be a mere deception of our senses, and that
there were absolutely no objects in nature.
When this Hypothesis made a noise in the
world, Buffon broached a theory very
different, and argued that every thing in
nature was a ^{material} ~~subtialized~~ ^{spirit}. When
human folly had thus got (as every one supposes)

supposed to its ~~same~~ highest pitch; Thence
published his Essay on the human mind
and called in question both the existence
of spirit & matter. Thus gentlemen by these
three philosophers we should be annihilated.
one destroys the body, the other the Soul,
and the third, them both. Excuse this short
account of the chimeras of madmen, who
attempted to reform the world. —

1st Every ~~Impression~~ Idea in the mind, is suppo-
sed to be made by Impressions on the brain,
thru the medium of the senses, as on wax;
or else thru the medium of the Imagination.
But the brain is incapable of receiving impress-
ions like wax, from its different texture. —

2^d From our being able to form Ideas of things
having no figure, as heat, cold &c. —

3^d Our Imagination is different at different
times respecting the same subject. —
I divide human knowledge into 2 kinds

1st Ideas of knowable substances 2^{dly} a mixture of sensation & Idea, which is what ~~attracts~~ Reid calls Notions or Thoughts. Ideas, are produced by motions in the brain, as well as sensations - Notions are the effect of a mixture of these motions. Ideas, therefore, are not substances, but mere qualities, as much so as sound; hence we comprehend the vast extent of memory; in fact it may be infinite; for Ideas can no more produce a plethora, than words can fill a room.

2.^o Association, is a combination of memory with perception. We have a perception of this stove, tomorrow upon looking at the stove, the perception & memory of having seen it before, are both excited in the brain; at the same time, Association is the consequence. Association is in the ~~body~~ ^{mind}, what sympathy is in the body.

Thus we can associate Ideas of things we have never seen, heard, tasted, smelled or felt; What, then is thought? I answer a motion in the brain. What produces it? Stimulus. How does stimulus produce thought? I answer by producing impression on the nerves, which produces action in those parts of the brain, which are the seats of memory, Imagination, Understanding. Ideas, I repeat, are mere qualities, as much as the sound from a bell. We have Ideas of things which are not cognizable by the senses. Who can think of a hero, without associating the name of Washington, Buonaparte, ~~Charras~~ Massena? Or who can hear of a great & learned physician, without thinking of Sydenham, Cullen. We also place a just association, thus by standing in the place you are accustomed to, in the day, in the dark, you can sometimes recollect the name on a sign, which

you ~~was~~ were puzzled to do before.

The time of day exerts an influence on the association. Thus if an Idea struck me yesterday morning when the clock struck 7: It will recur this morning at the same hour & in a similar situation. Position of body assists association; if you wish to recall a lost Idea, place yourself in the place & position you were when the Idea was first excited.

Lecture 12th

Fourthly, Pain influences association. Hence females are considered the best witnesses, in Courts on old disputes, they calculate very correctly, as to time, from their different labours. They have been called living almanacks, & boys are whipped at setting land marks, that they may be capable of giving evidence at a future day of the spot.

5th Letters against association, I knew a student of medicine who could never remember when there were 2 arteries, or 2 veins, in the Umbilical chord, till he associated the 2 aa & one V. in Boerhaave's name. 6th Any being connected with pleasure, in instances of this, you must all be acquainted with

7th Arbitrary signs assist in associating Ideas, a thread tied round the finger will recall the Idea you had when ~~the~~ the string was applied

8th Similar Sounds recall long forgotten Ideas, the Swiss are melancholy on hearing a certain tune as it recalls the Ideas of past sorrows.

9th A remarkable association exists between words, The first line of a poem often enables us to repeat the subsequent ones. A person who was in Lisbon when the great Earthquake happened, always was seized with Horror at the pronunciation of the word Earthquake.

Col. Taitton dined in company, in
Liverpool, the host told him not to mention
the word blood, as one of his guests fainted
on hearing it; after dinner the Col. was
interrogated about a battle in America
at which he said was much bloodshed; the
gentleman instantly fell backward & fainted
A boy was affected in like manner on
hearing the word Jesus, as he associated it
with a dreadful thunder storm in which
his mother pronounced that awful name
at the moment she was struck
with lightning. 10 ^{thly} words ~~that a~~ ^{have} ~~reasonable~~ ^{no}
immediate connection with the idea will recall it.
Thus a person enquiring after a man, whose name
he had forgot, said it was like point no point.
I was answered it was Alexander Alexander

who ever after went by the name of point
no point. — 11.^{thly} Temperature exerts an influence
on association. Thus the first warm day in the winter
gives us an idea of Spring & all its enjoyments
I have experienced this pleasing sensation an
hundred times. 12. Customs has a powerfull in-
fluence on association. 13.^{thly} Interest. A miser
never forgets the place where he deposits his
money.

3.rd Judgement may be defined a continued
& combined exercise of Understanding & memory, the
mind without them would be a mere chaos. It consists
in making out one simple proposition from 2 or
more Ideas acquired either by association, or directly
from the memory. For example, If I am called to see
patients in a goal or prison ship — and if I find
him labouring under symptoms common
to several of his comrades, and with all suppose the
disease in all, to proceed from the same source.
Contagion

This I call an act of the judgment.

A difference between Reason & judgment may be defined - an instance of the first occurs whenever ^{from} two or more Ideas one proposition is formed.

4th Reason may be said to consist in deducing principles from Ideas. For example if I see the application of cold air of service in the small-pox, and knowing ^{fever} all to be the ~~the~~ same, if I suppose cold air to be useful in bilious & yellow fevers; I exercise my reasoning powers; from several propositions I deduce one principle - the 1st proposition is that cold air is of use in small-pox - the 2^d that small-pox & yellow fever are both of an inflammatory nature - ~~that the application of cold is not true~~ ^{that the application of cold is useful in all inflam}

~~in atony diseases from these I judge that~~
~~cold air will be useful in yellow fever.~~

H. H.

